APPENDIX B

Releases reported to the National Response Center
1982 - 1990

Appendix B details information concerning hydrazine and NO_x releases reported to the National Response Center from 1982-1990. NO_x compounds include nitrogen tetroxide and its primary dissociation products, nitrogen dioxide and nitrogen oxide. Anhydrous hydrazine and monomethyl hydrazine, are the only compounds used by Astrotech to appear on the SARA Title III list of Extremely Hazardous Substances; releases of NO_x are also required to be reported to the National Response Center under CERCLA.

Both the hydrazines and nitrogen tetroxide have a wide variety of other uses. The largest manufacturers of anhydrous hydrazine in the U.S. are Olin Chemicals (approximately 21 million lbs/yr), Mobay (14 million lbs/yr and Fairmount Chemical (1 million lbs/yr). Total U.S. production averages around 36 million lbs/yr, of which 29 million lbs are sold commercially. Nitrogen tetroxide is manufactured by a single source in the U.S., Cedar Chemical Corporation in Vicksburg, MS. Based on data from the U.S. Air Force Directorate of Energy Management, Kelly AFB, the annual production capacity for nitrogen tetroxide is estimated to be 3 million lbs per year.

Because anhydrous hydrazine and monomethyl hydrazine can both be reported as hydrazine solutions, the graph that follows, Discharges of Hydrazine Releases, summarizes releases of all forms of hydrazine reported. The majority (35.06%) of the releases were from public utilities, with another significant portion from manufacturing/chemical industries (28.57%). NASA or space-related releases only accounted for 9.09% of the total.

A similar graph for Discharges of NO_x Releases, indicates that the majority of releases originate from manufacturing/chemical industrial users (74.24%), and that only 10.61% of the releases originate with NASA or space-related concerns.

The final figures in this appendix show the distribution of releases over a range of release rates (number of pounds per release). In the majority of hydrazine releases, less that 10 pounds was released. However, slightly more NO_x was released in each incident, with most spills falling in the 10 to 100 pound range.

HYDRAZINE AND NOX RELEASES, 1982 - 1990*

HYDRAZINE

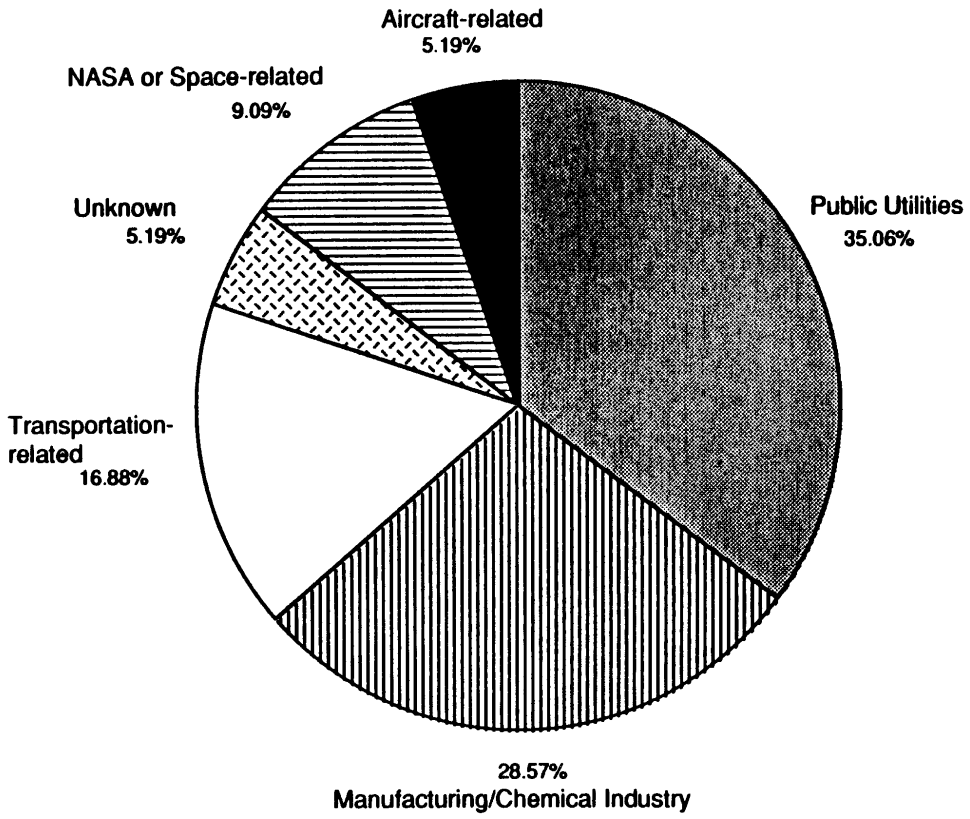
Material+	Total No Releases	RELEASE DISCHARGER					
		Public Utilities	Manufacturing/ Chem. Industry	Transportation-Related	Aircraft-Related	NASA or Space-Related	Unknown
Hydrazine@	41	15	12	2	4	5	3
Hydrazine 35%	12	8	3	1	0	0	0
Hydrazine 54%	2	1	0	1	0	0	0
UDMH	3	0	3	0	0	0	0
Monomethylhydrazine	1	0	0	1	0	0	0
Other Hydrazine Solutions^	18	3	4	8	0	2	1
TOTALS:	77	27	22	13	4	7	4

NOX

Material+	Total No Releases	RELEASE DISCHARGER					
		Public Utilities	Manufacturing/ Chem. Industry	Transportation-Related	Aircraft-Related	NASA or Space-Related	Unknown
N2O4	31	1	19	3	1	6	1
Other NOX (NO, NO2)	35	3	30	0	1	1	0
TOTALS:	66	4	49	3	2	7	1

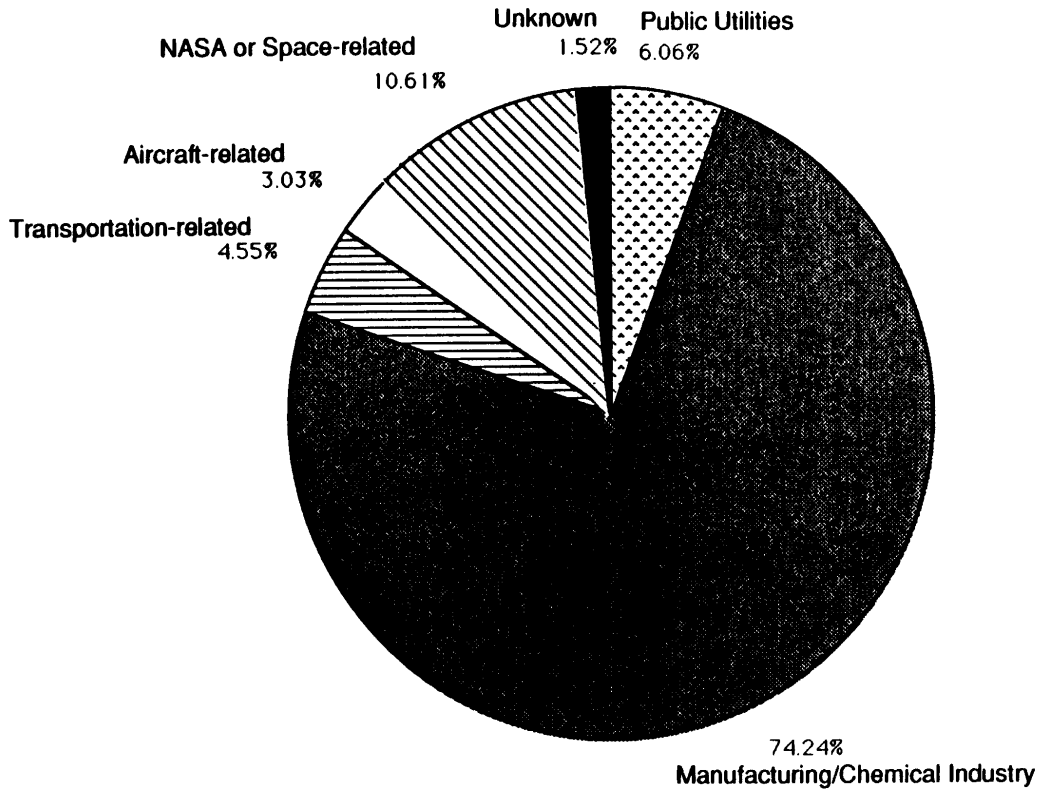
* As reported to the National Response Center (NRC).
\+ Chemical characterizations as reported to the NRC. Due to inconsistencies in release reporting, reports of Hydrazine releases may include some Hydrazine solutions.
@ Includes one release of Aerozine 50 (50% UDMH, 50% Hydrazine)
^ Solutions include: Hydrazine 22%, ORM-A.N.O.S. 30%, Hydrazine Aqueous Solution UN2030, Hydrazine 2-1/2%, and Hydrazine and NDMA (wastewater).

DISCHARGES OF HYDRAZINE, 1982 - 1990



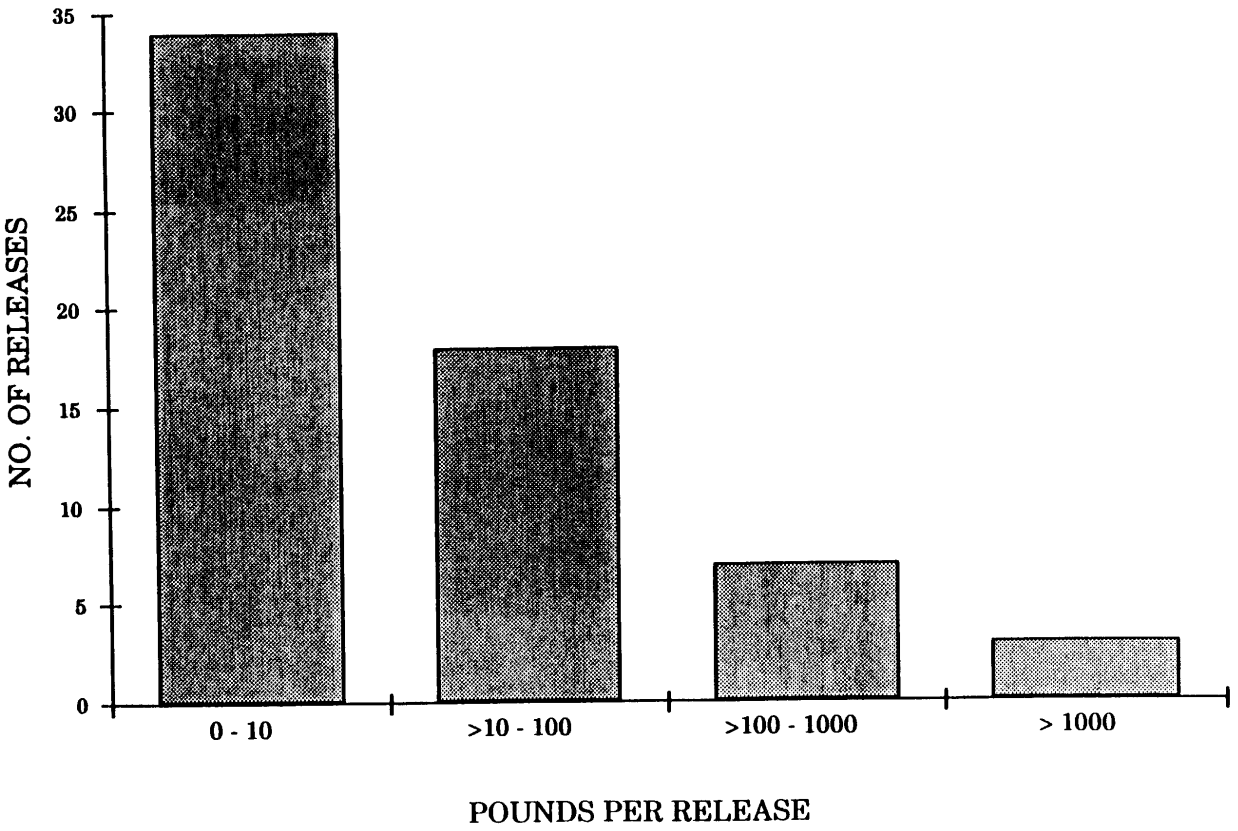
NOTE: Table shows releases as reported to the National Response Center. Due to inconsistencies in reporting, reports of hydrazine releases may include some hydrazine solutions.

DISCHARGES OF NOX , 1982 - 1990



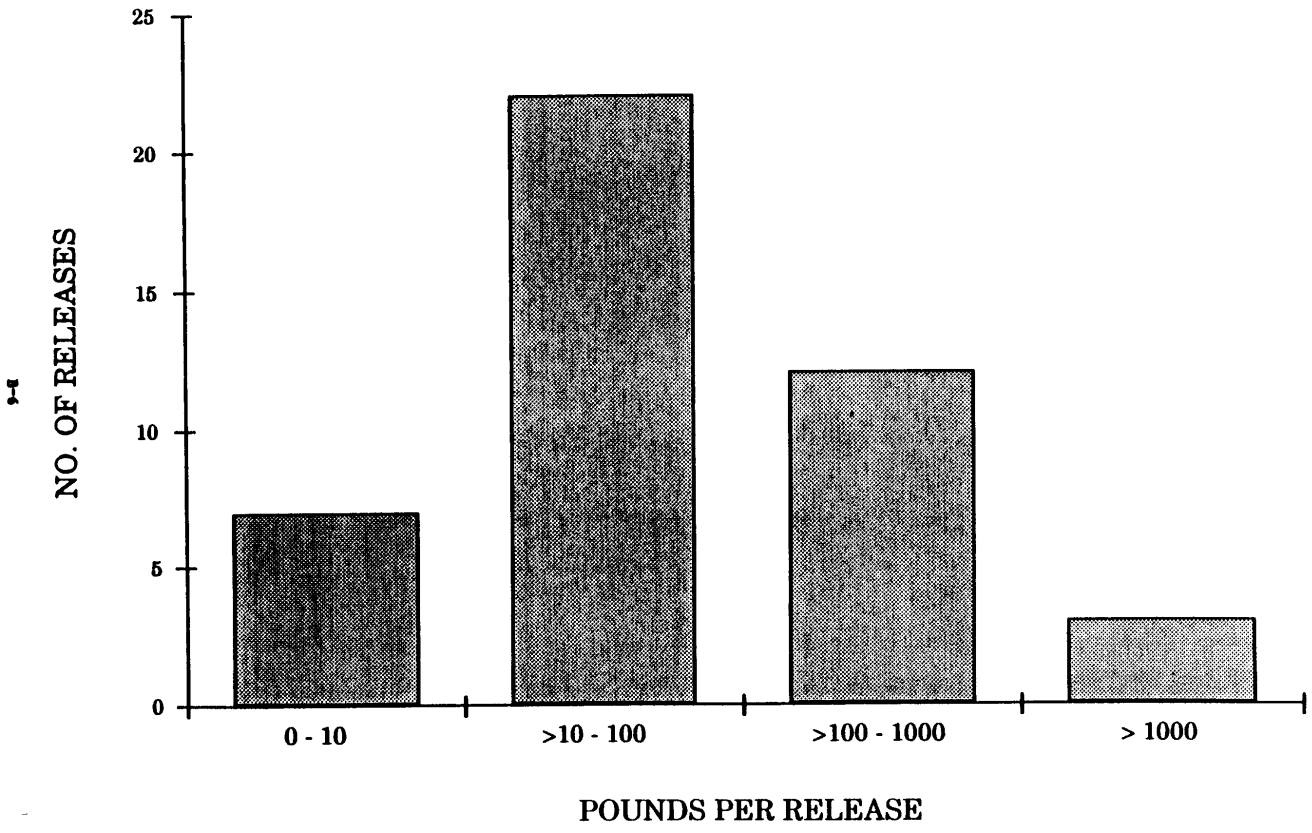
NOTE: Table shows releases as reported to the National Response Center. Releases include nitrogen tetroxide, nitrogen dioxide, and nitrogen oxide.

QUANTITIES OF HYDRAZINE RELEASED, 1982 - 1990



NOTE: Quantities shown are those reported to the National Response Center . Table includes releases of anhydrous hydrazine as well as hydrazine solutions.

QUANTITIES OF NOX RELEASED, 1982 - 1990



NOTE: Quantities shown are those reported to the National Response Center. Table includes releases of nitrogen tetroxide, nitrogen dioxide, and nitrogen oxide.